ECOLOGY AND ENVIRONMENT, INC.
FIELD INVESTIGATION TEAM
SITE SAFETY PLAN

A. GENERAL INFORMATION

SITE: NAIMAN CO./CARAVAN CO. TDD NO.: F05-8708-023

WSTS/ACCOUNT NO: F0H0732 SI

LOCATION: 6410 & 6427 EASTLAND RD., BROOK PARK, OHIO

PLAN PREPARED BY: DIRK KAISER DATE: 7/27/87

APPROVED BY: Anne M. Stumpf DATE: 8/10/87

OBJECTIVE(S): (including description of work to be performed):
FIT TEAM TO CONDUCT AN ON-SITE INSPECTION AT THE ADJACENT FACILITIES INCLUDING AN INTERVIEW WITH KNOWLEDGEABLE PARTIES AND SAMPLING; 6 SOIL/SEDIMENT SAMPLES.

PROPOSED DATE OF INVESTIGATION: AUG. 25, 1987

BACKGROUND REVIEW: Complete: X Preliminary: _____

DOCUMENTATION/SUMMARY: Overall Hazard: Serious: _____ Moderate: _____
Low: X Unknown: _____

B. SITE/WASTE CHARACTERISTICS

WASTE TYPE(S): Liquid _____ Solid X Sludge _____ Gas _____

CHARACTERISTIC(S): Corrosive _____ Ignitable _____ Radioactive _____ Volatile _____
Toxic X Reactive _____ Unknown _____ Other (Name) PERSISTANT

FACILITY DESCRIPTION: THE SITES WERE FORMERLY WETLANDS IN WHICH FOUNDRY SAND WAS DEPOSITED AND SINCE COVERED WITH FILL. Now two active facilities occupy this site.

Principal Disposal Method (type and location): DUMP/LANDFILL ALONG ABRAMS CREEK.

Unusual Features (dike integrity, power lines, terrain, etc.): ABRAMS CREEK, EASTLAND RD. RUNS THROUGH CENTER OF SITE, OWNED BY TWO DIFFERENT COMPANIES.

Status: (active,) inactive, unknown) WAREHOUSES, AND MANUFACTURING FACILITIES ON-SITE. Foundry Sand dumped here ~ 1967 - 1977.

History: (Worker or non-worker injury; complaints from public; previous agency action): THE SITE IS COMPOSED OF FIRED AND UNFIRED FOUNDRY SAND DUMPED THERE IN THE LATE SIXTIES AND EARLY SEVENTIES. THE SITE WAS INVESTIGATED BY THE C.O.E.

C. HAZARD EVALUATION

(Use Hazard Evaluation of Chemicals sheets for specific or representative chemicals present.):

HEAVY METALS
PCBs IN OIL
Aluminum Chloride
Aluminum Fluoride
Aluminum Nitrate
Aluminum Sulfate
Benzene
Chromium (hexavalent)
Chromium (metal)
Lead
Toluene
Xylene
carbon disulfide

The above chemicals are poss. ble Chemical contaminants in the Foundry Sands.

D. SITE SAFETY WORK PLAN

PERIMETER ESTABLISHMENT: Map/Sketch Attached YES Site Secured? No
Perimeter Identified? YES Zone(s) of Contamination Identified? YES
ENTIRE SITE ALONG WITH ABRAMS CREEK IS CONTAMINATED.

PERSONAL PROTECTION

Level of Protection: A ___ B ___ C ___ D X

Modifications: UPGRADE TO LEVEL C IF DRY, DUSTY CONDITIONS EXIST OR ^ OVA READS 1 TO 5 PPM ABOVE BACKGROUND. IF READINGS EXCEED 5 PPM ABOVE BACKGROUND, ABANDON THE SITE AND CONTACT RSC.

Surveillance Equipment and Materials: ACTION LEVELS:

OVA: 0-1 ppm over background - Level D
>1-5 ppm " " " C
>5-500 ppm " " " B } ABANDON SITE AND CONTACT RSC
>500 ppm " " " A

RAD-MINI: ABANDON SITE & CONTACT RSC. IF ALARM GOES OFF AT .1x LEVEL SETTING. (0.1 mR/hr.)

EXPLOSIMETER / O_2 METER: >30% LEL - ABANDON SITE AND CONTACT RSC.
<19.5% OR >25% O_2 - ABANDON SITE AND CONTACT RSC.

DRAGER TUBES/MONTOX WILL NOT BE NEEDED AS THERE IS NO RECORD OF CN AT THE SITE.

DECONTAMINATION PROCEDURES: CONTAMINATED EQUIPTMENT & DISPOSABLES WILL BE WASHED WITH ALCONOX & RINSED WITH DISTILLED WATER. WASH AND RINSE WATER WILL BE LEFT ON-SITE. PRIOR PERMISSION TO BE OBTAINED.

Special Equipment, Facilities, or Procedures: NONE

SITE ENTRY PROCEDURES: OBTAIN PERMISSION FROM OWNER PRIOR TO ENTRY. OBSERVE BUDDY SYSTEM AT ALL TIMES. STAY UPWIND OF CONTAMINATED AREAS AS MUCH AS POSSIBLE. OBEY FACILITY'S SAFETY PROCEDURES AS A MINIMUM.

Team Member	Responsibility
DIRK KAISER	TEAM LEADER
CRAIG ALMANZA	SAMPLER
CATHY SCHLESINGER	TEAM MEMBER
DON CLARK	Site Safety Officer
RON SHORT	TEAM MEMBER

WORK LIMITATIONS (Time of day, etc.): WORK DAYLIGHT HOURS ONLY, MONITOR TEAM MEMBERS FOR HEAT STRESS, OBSERVE THE 'BUDDY SYSTEM' AT ALL TIMES.

INVESTIGATION-DERIVED MATERIAL DISPOSAL: ALL INVESTIGATION DERIVED MATERIAL WILL BE DOUBLE BAGGED, LABELED 'POTENTIALLY HAZARDOUS' AND DISPOSED OF ON-SITE. Prior permission to be obtained.

E. EMERGENCY INFORMATION*

LOCAL RESOURCES

Ambulance 216/671-6200 IMMEDIATE MEDICAL SERVICES, INC.
Hospital Emergency Room SOUTHWEST COMMUNITY HOSPITAL 216/826-4000
Poison Control Center 216/231-4455
Police 216/433-1234 BROOK PARK POLICE DEPT.
Fire Department 216/433-1212 BROOK PARK FIRE DEPT.
Airport 216/261-1066 CLEVELAND - HOPKINS AIRPORT
Explosives Unit 216/433-1212 BROOK PARK FIRE DEPT.
EPA Contact BILL REYNOLDS 312/886-1660

SITE RESOURCES

Water Supply TO BE LOCATED PRIOR TO SITE ENTRY
Telephone " " " " "
Radio N/A
Other N/A

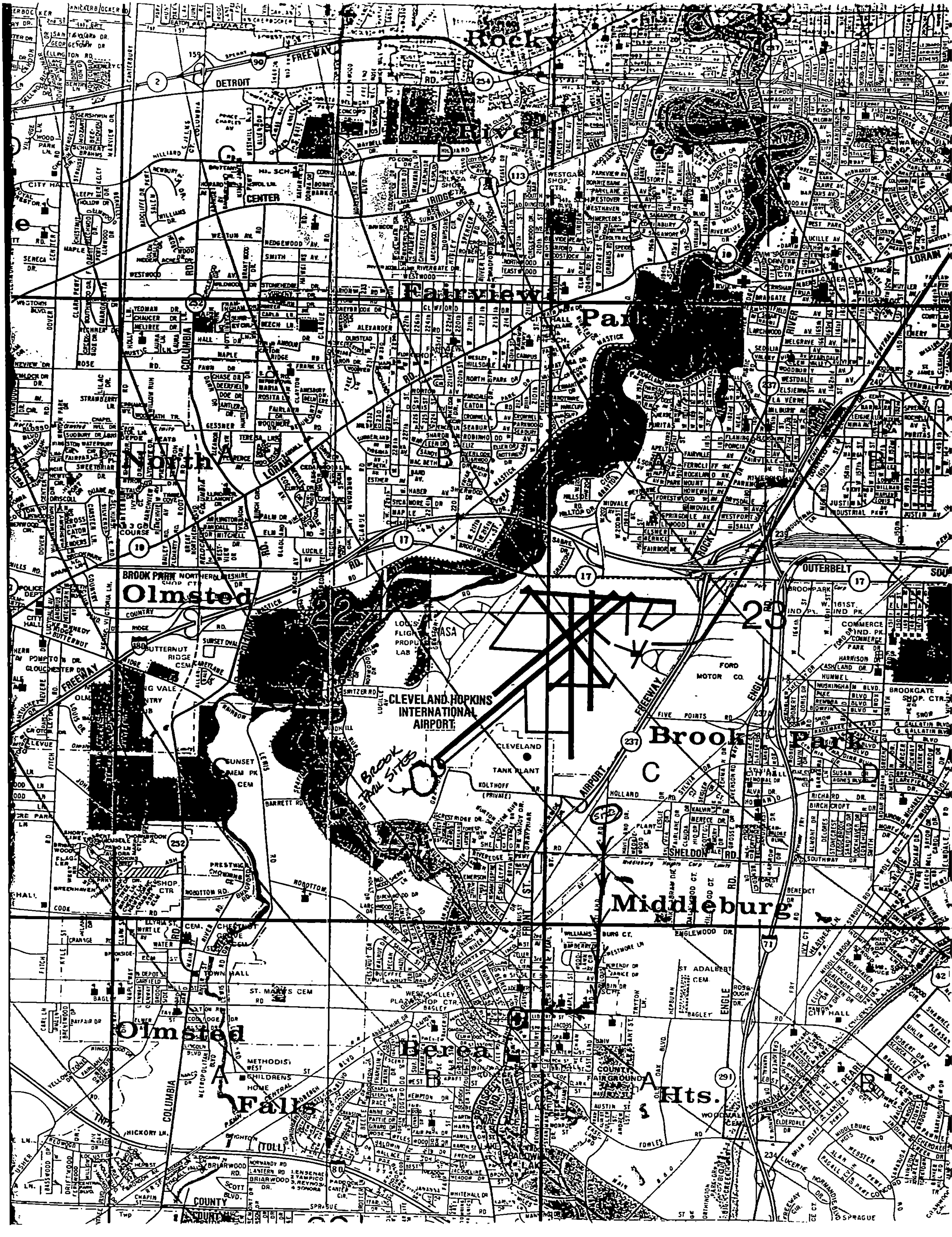
EMERGENCY CONTACTS

1.	Mr. Raymond Harbison (University of Arkansas)	(501) 661-5766 or 661-5767
	MED-TOX	(501) 370-8263 (24 hours)
2.	Regional Safety Coordinator - Paul Moss	Non-responsive)
3.	Regional Project Manager- Rene Van Someren	(312) 763-7335
4.	FIT Office	(312) 663-9415
5.	E & E 24 Hour Call Line	(716) 631-9530 (24 Hours; Call Forwarding)
6.	Regional Health Maintenance Program Contact	PMI - (312) 832-8820 8:00 a.m. - 5:00 p.m.
7.	Paul Jonmaire.....	(716) 631-9530 (Response Center)
	Corporate Safety Director	(716) 632-4491 (office)
8.	Ecology and Environment, Inc. NPMO	(703) 522-6065

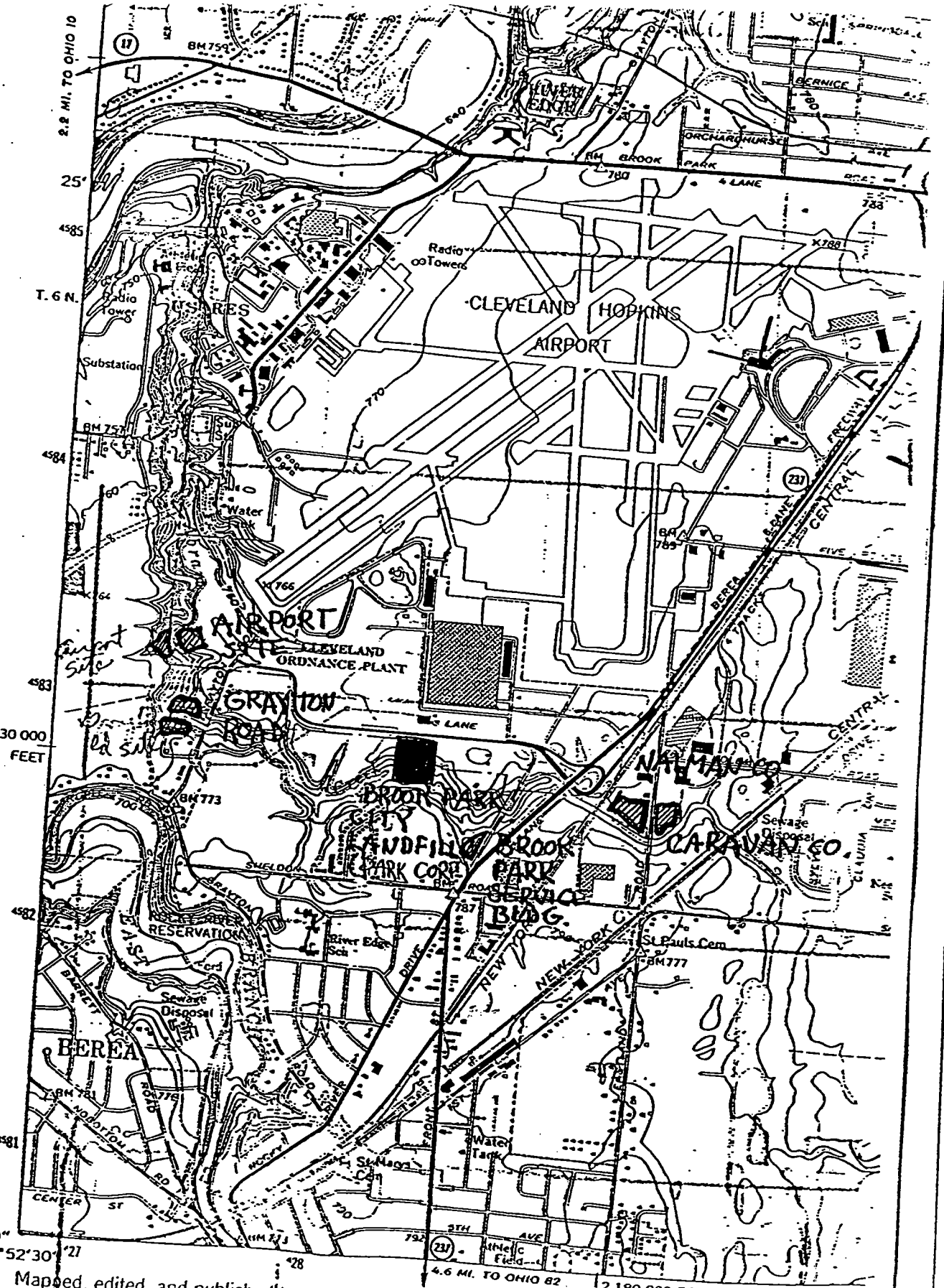
F. EMERGENCY ROUTES

(Give road or other directions; attach map)

Hospital: SOUTH ON EASTLAND RD. ABOUT 1 MILE, WEST (RT) ON BAGLEY RD. ~1/2 MILE, HOSPITAL ON LEFT AT BAGLEY/PROSPECT RD INTERSECTION.



Rocky
River
Fairview
Park
North
Olmsted
CLEVELAND HOPKINS
INTERNATIONAL
AIRPORT
BROOK PARK SITES
Brook
Park
Middleburg
Hts.
Olmsted
Falls
Berea
22
23
NASA
LEWIS
FLIGHT
PROPULSION
LAB
CLEVELAND
TANK PLANT
FORD
MOTOR CO.
OUTERBELT
FREEWAY
CITY HALL
COUNTY
FAIRGROUNDS



(WEST VIEW)
4666 IV SW

Mapped, edited, and published by the Geological Survey
Revised in cooperation with State of Ohio agencies

Control by USGS, USC&GS, and Cleveland Regional Geodetic Survey

Planimetry by photogrammetric methods from aerial photographs taken 1952. Topography by plane-table surveys 1953. Revised from aerial photographs taken 1962. Field checked 1963

Selected hydrographic data compiled from U. S. Lake Survey Chart 35 (1959) This information is not intended for navigational purposes

Polyconic projection. 1927 North American datum

LAKEWOOD, OH QUAD

MN
GN
3½°
62 MILS
0°32'
9 MILS

ALUMINUM CHLORIDE

FOH073251
8/15/87

ACL

Common Synonyms Anhydrous aluminum chloride	Solid crystals or powder — Yellow-orange to grayish-white — Irritating odor Sinks in water. Poisonous gas is produced on contact with water.

Keep people away. Evacuate area in case of large discharge.
Avoid contact with solid or dust.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Not flammable.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Do not use water on adjacent fires.
Extinguish adjacent fires with dry chemical or foam.

Exposure

CALL FOR MEDICAL AID

DUST
Irritating to eyes, nose and throat.
Harmful if inhaled.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

SOLID
Will burn skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
DO NOT INDUCE VOMITING.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intakes.
Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Disperse and flush with care
Issue warning-corrosive

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Not listed
3.2 Formula: $AlCl_3$
3.3 IMO/UN Designation: 8.0/1726
3.4 DOT ID No.: 1726
3.5 CAS Registry No.: 7446-70-0

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Solid
4.2 Color: Orange to yellow through gray to white
4.3 Odor: Like hydrogen chloride; like hydrochloric acid

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: All personnel in the area should wear safety clothing, including fully closed goggles, rubber or plastic-coated gloves, rubber shoes, and coveralls of acid-resistant material. An acid-vapor canister mask should be carried in case of emergency. In certain applications, it may be advisable to wear this equipment on a routine basis.
5.2 Symptoms Following Exposure: Contact with the skin or eyes in the presence of moisture causes thermal and acid burns.
5.3 Treatment of Exposure: INGESTION: if victim is conscious have him drink water or milk. Do NOT induce vomiting. SKIN: flush immediately with plenty of water. For eye contact, flush with water for at least 15 mins. and get medical attention immediately.
5.4 Threshold Limit Value: 5 ppm (hydrogen chloride)
5.5 Short Term Inhalation Limits: 5 ppm for 5 min.; 30 ppm for 10 min.; 20 ppm for 20 min.; 10 ppm for 60 min. (all for hydrogen chloride.)
5.6 Toxicity by Ingestion: No systemic effects, but severe burns of mouth.
5.7 Late Toxicity: None recognized
5.8 Vapor (Gas) Irritant Characteristics: Vapor (of hydrogen chloride) is moderately irritating such that personnel will not usually tolerate moderate or high vapor concentrations.
5.9 Liquid or Solid Irritant Characteristics: Fairly severe skin irritant; may cause pain and second-degree burns after a few minutes' contact.
5.10 Odor Threshold: 1-5 ppm (hydrogen chloride)
5.11 IDLH Value: 100 ppm

6. FIRE HAZARDS

6.1 Flash Point: Not flammable
6.2 Flammable Limits in Air: Not flammable
6.3 Fire Extinguishing Agents: Not pertinent
6.4 Fire Extinguishing Agents Not to be Used: Do not use water on adjacent fires
6.5 Special Hazards of Combustion Products: Not pertinent
6.6 Behavior in Fire: Reacts violently with water used in extinguishing adjacent fires
6.7 Ignition Temperature: Not flammable
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: Not flammable
6.10 Adiabatic Flame Temperature: Not pertinent
6.11 Stoichiometric Air to Fuel Ratio: Not pertinent
6.12 Flame Temperature: Not pertinent

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: Reacts violently with water, liberating hydrogen chloride gas and heat.
7.2 Reactivity with Common Materials: None if dry. If wet it attacks metals because of hydrochloric acid formed; flammable hydrogen is formed.
7.3 Stability During Transport: Stable if kept dry and protected from atmospheric moisture.
7.4 Neutralizing Agents for Acids and Caustics: Hydrochloric acid formed by reaction with water can be flushed away with water. Rinse with sodium bicarbonate or lime solution.
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: Data not available

8. WATER POLLUTION

8.1 Aquatic Toxicity: Not pertinent
8.2 Waterfowl Toxicity: Not pertinent
8.3 Biological Oxygen Demand (BOD): Not pertinent
8.4 Food Chain Concentration Potential: Not pertinent

9. SHIPPING INFORMATION

9.1 Grades of Purity: Pure: 99.7%; technical: 98.5%
9.2 Storage Temperature: Data not available
9.3 Inert Atmosphere: Data not available
9.4 Venting: Data not available

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

RR-C

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Not listed
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	3
Flammability (Red)	0
Reactivity (Yellow)	2
	W

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Solid
12.2 Molecular Weight: 133.34
12.3 Boiling Point at 1 atm: Not pertinent
12.4 Freezing Point: 381°F = 193.9°C = 467.1°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 2.44 at 25°C (solid)
12.8 Liquid Surface Tension: Not pertinent
12.9 Liquid Water Interfacial Tension: Not pertinent
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: Not pertinent
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: 63.6 cal/g
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not available

NOTES

CHRIS, Vol. III

ALUMINUM FLUORIDE

FOH0732SE 8/28/87

ALF

Common Synonyms	Solid powder or granules	White	Odorless
	Sinks in water.		

Avoid contact with dust.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Not flammable.
POISONOUS GASES MAY BE PRODUCED WHEN HEATED.
Wear goggles and self-contained breathing apparatus.

Exposure

DUST
If inhaled, irritating to nose and throat.
Move to fresh air.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Dispose and flush

2. LABEL

2.1 **Category:** None
2.2 **Class:** Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 **CG Compatibility Class:** Not listed
3.2 **Formula:** $AlF_3{\cdot}3H_2O$
3.3 **IMO/UN Designation:** Not listed
3.4 **DOT ID No.:** Data not available
3.5 **CAS Registry No.:** 7784-18-1

4. OBSERVABLE CHARACTERISTICS

4.1 **Physical State (as shipped):** Solid
4.2 **Color:** White
4.3 **Odor:** None

5. HEALTH HAZARDS

5.1 **Personal Protective Equipment:** Goggles to protect against airborne particles and possibly respirator for intermittent heavy dust exposures.
5.2 **Symptoms Following Exposure:** ACUTE: respiratory irritation; possible nose bleeding or vomiting; CHRONIC: aggravates bronchitis/asthma; increased bone density.
5.3 **Treatment of Exposure:** For acute poisoning, oral administration of limewater, intravenous infusion of glucose, and intravenous injections of calcium gluconates.
5.4 **Threshold Limit Value:** 2 mg/m³
5.5 **Short Term Inhalation Limits:** Not pertinent
5.6 **Toxicity by Ingestion:** LD_{Lo} = 600 mg/kg (guinea pig)
5.7 **Late Toxicity:** Skeletal fluorosis (bone abnormalities) in humans, working in aluminum plant for 12 years.
5.8 **Vapor (Gas) Irritant Characteristics:** Not pertinent
5.9 **Liquid or Solid Irritant Characteristics:** No appreciable hazard. Practically harmless to the skin.
5.10 **Odor Threshold:** Not pertinent
5.11 **IDLH Value:** Data not available

6. FIRE HAZARDS

6.1 **Flash Point:** Not flammable
6.2 **Flammable Limits in Air:** Not flammable
6.3 **Fire Extinguishing Agents:** Not pertinent
6.4 **Fire Extinguishing Agents Not to be Used:** Not pertinent
6.5 **Special Hazards of Combustion Products:** When heated to sublimation condition, emits toxic fumes of fluoride
6.6 **Behavior in Fire:** Not pertinent
6.7 **Ignition Temperature:** Not flammable
6.8 **Electrical Hazard:** Not pertinent
6.9 **Burning Rate:** Not flammable
6.10 **Adiabatic Flame Temperature:** Not pertinent
6.11 **Stoichiometric Air to Fuel Ratio:** Not pertinent
6.12 **Flame Temperature:** Not pertinent

7. CHEMICAL REACTIVITY

7.1 **Reactivity With Water:** No reaction
7.2 **Reactivity with Common Materials:** No reaction
7.3 **Stability During Transport:** Stable
7.4 **Neutralizing Agents for Acids and Caustics:** Not pertinent
7.5 **Polymerization:** Not pertinent
7.6 **Inhibitor of Polymerization:** Not pertinent
7.7 **Molar Ratio (Reactant to Product):** Data not available
7.8 **Reactivity Group:** Data not available

8. WATER POLLUTION

8.1 **Aquatic Toxicity:** 60 ppm/*/fish/lethal/fresh water *Time period not specified.
8.2 **Waterfowl Toxicity:** Data not available
8.3 **Biological Oxygen Demand (BOD):** Not pertinent
8.4 **Food Chain Concentration Potential:** None noted

9. SHIPPING INFORMATION

9.1 **Grades of Purity:** 90.7%
9.2 **Storage Temperature:** Data not available
9.3 **Inert Atmosphere:** Data not available
9.4 **Venting:** Data not available

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

II

11. HAZARD CLASSIFICATIONS

11.1 **Code of Federal Regulations:** Not listed
11.2 **NAS Hazard Rating for Bulk Water Transportation:** Not listed
11.3 **NFPA Hazard Classification:** Not listed

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 **Physical State at 15°C and 1 atm:** Solid
12.2 **Molecular Weight:** 83.98
12.3 **Boiling Point at 1 atm:** Not pertinent
12.4 **Freezing Point:** Not pertinent
12.5 **Critical Temperature:** Not pertinent
12.6 **Critical Pressure:** Not pertinent
12.7 **Specific Gravity:** 2.88 at 25°C (solid)
12.8 **Liquid Surface Tension:** Not pertinent
12.9 **Liquid Water Interfacial Tension:** Not pertinent
12.10 **Vapor (Gas) Specific Gravity:** Not pertinent
12.11 **Ratio of Specific Heats of Vapor (Gas):** Not pertinent
12.12 **Latent Heat of Vaporization:** Not pertinent
12.13 **Heat of Combustion:** Not pertinent
12.14 **Heat of Decomposition:** Not pertinent
12.15 **Heat of Solution:** Not pertinent
12.16 **Heat of Polymerization:** Not pertinent
12.25 **Heat of Fusion:** Data not available
12.26 **Limiting Value:** Data not available
12.27 **Reid Vapor Pressure:** Data not available

NOTES

CHRIS, vol. III

ALUMINUM NITRATE

FOHO732 SI
8/28/87

ALN

Common Synonyms	Solid	White	Odorless
Aluminum nitrate nonahydrate Nitric acid, aluminum salt	Sinks and mixes slowly with water.		

Stop discharge if possible. Keep people away.
Avoid contact with solid and dust.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Not flammable.
POISONOUS GASES MAY BE PRODUCED IN FIRE.
Wear goggles and self-contained breathing apparatus.

Exposure

CALL FOR MEDICAL AID.

DUST
Irritating to eyes, nose and throat.
Harmful if inhaled.
If in eyes, hold eyelids open and flush with plenty of water.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

SOLID
Irritating to skin and eyes.
If swallowed will cause nausea or vomiting.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)
Issue warning-water contaminant
Disperse and flush

2. LABEL

2.1 Category: Oxidizer
2.2 Class: 5

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Not listed
3.2 Formula: $Al(NO_3)_3 \cdot 9H_2O$
3.3 IMO/UN Designation: 5.1/1438
3.4 DOT ID No.: 1438
3.5 CAS Registry No.: Data not available

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Solid
4.2 Color: White
4.3 Odor: None

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Goggles or face shield; dust respirator; rubber gloves
5.2 Symptoms Following Exposure: Ingestion of large doses causes gastric irritation, nausea, vomiting, and purging. Contact with dust irritates eyes and skin.
5.3 Treatment of Exposure: EYES: flush with water for at least 15 min. SKIN: flush with water; wash with soap and water.
5.4 Threshold Limit Value: 2 mg/m³
5.5 Short Term Inhalation Limits: Data not available
5.6 Toxicity by Ingestion: Grade 3; oral rat LD_{50} = 264 mg/kg (nonahydrate)
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Data not available
5.9 Liquid or Solid Irritant Characteristics: Data not available
5.10 Odor Threshold: Odorless
5.11 IDLH Value: Data not available

6. FIRE HAZARDS

6.1 Flash Point: Not flammable
6.2 Flammable Limits in Air: Not flammable
6.3 Fire Extinguishing Agents: Not pertinent
6.4 Fire Extinguishing Agents Not to be Used: Not pertinent
6.5 Special Hazards of Combustion Products: Toxic oxides of nitrogen may form in fire.
6.6 Behavior in Fire: May increase the intensity of fire when in contact with combustible material
6.7 Ignition Temperature: Not pertinent
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: Not pertinent
6.10 Adiabatic Flame Temperature: Not pertinent
6.11 Stoichiometric Air to Fuel Ratio: Not pertinent
6.12 Flame Temperature: Not pertinent

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: Dissolves and forms a weak solution of nitric acid. The reaction is not hazardous.
7.2 Reactivity with Common Materials: May corrode metals in presence of moisture
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Flush with water
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: Data not available

8. WATER POLLUTION

8.1 Aquatic Toxicity: 0.07 ppm/10 days/stickleback/killed/ fresh water
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): None
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Reagent, 99+%; Technical
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)
SS

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Oxidizer
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification: Not listed

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Solid
12.2 Molecular Weight: 375.13
12.3 Boiling Point at 1 atm: Not pertinent (decomposes)
12.4 Freezing Point: 163°F = 73°C = 346°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: >1 at 20°C(solid)
12.8 Liquid Surface Tension: Not pertinent
12.9 Liquid Water Interfacial Tension: Not pertinent
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: Not pertinent
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not available

NOTES

CHRIS, vol. III

ALUMINUM SULFATE

POH0732
8/28/87

ALM

Common Synonyms	Solid	Gray-white	Odorless
Cake aluminum Patent aluminum	Sinks and mixes slowly with water.		

AVOID CONTACT WITH LIQUID AND VAPOR. KEEP PEOPLE AWAY.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Shut off ignition sources. Call fire department.
Stop discharge if possible.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Not flammable.
Wear goggles, self-contained breathing apparatus and rubber overclothing (including gloves).
Extinguish with dry chemicals or carbon dioxide.
DO NOT USE WATER ON FIRE.

Exposure

CALL FOR MEDICAL AID.

DUST
Irritating to eyes, nose and throat.
If inhaled will cause difficult breathing.
If in eyes, hold eyelids open and flush with plenty of water.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

SOLID
Irritating to skin and eyes.
If swallowed will cause nausea or vomiting.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intake.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Issue warning-water contaminant
Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Not listed
3.2 Formula: $Al_2(SO_4)_3 \cdot 18H_2O$
3.3 IMO/UN Designation: Not listed
3.4 DOT ID No.: 9078
3.5 CAS Registry No.: 10043-01-3

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Solid
4.2 Color: Gray-white
4.3 Odor: None

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Dust respirator; goggles or face shield; rubber gloves
5.2 Symptoms Following Exposure: Inhalation of dust irritates nose and mouth. Ingestion of large doses causes gastric irritation, nausea, vomiting, and purging. Dust irritates eyes and skin.
5.3 Treatment of Exposure: INHALATION: rinse nose and mouth with water. INGESTION: give large amounts of water. EYES: flush with water for at least 15 min. SKIN: flush with water, wash with soap and water.
5.4 Threshold Limit Value: 2 mg/m³
5.5 Short Term Inhalation Limits: Data not available
5.6 Toxicity by Ingestion: Grade 2; oral mouse LD_{50} = 770 mg/kg
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Data not available
5.9 Liquid or Solid Irritant Characteristics: Data not available
5.10 Odor Threshold: Data not available
5.11 IDLH Value: Data not available

6. FIRE HAZARDS

6.1 Flash Point: Not flammable
6.2 Flammable Limits in Air: Not flammable
6.3 Fire Extinguishing Agents: Not pertinent
6.4 Fire Extinguishing Agents Not to be Used: Water
6.5 Special Hazards of Combustion Products: Not pertinent
6.6 Behavior in Fire: Data not available
6.7 Ignition Temperature: Not pertinent
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: Not pertinent
6.10 Adiabatic Flame Temperature: Not pertinent
6.11 Stoichiometric Air to Fuel Ratio: Not pertinent
6.12 Flame Temperature: Not pertinent

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: May corrode metals in presence of moisture
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Flush with water.
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: Data not available

8. WATER POLLUTION

8.1 Aquatic Toxicity:
14ppm/36 hr/fundulus/fatal/fresh water
240ppm/48 hr/mosquitofish/TL$_m$/*
*Water type not specified.
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): None
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Technical
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

SS

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: ORM-E
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification: Not listed

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Solid
12.2 Molecular Weight: 666.4
12.3 Boiling Point at 1 atm: Not pertinent
12.4 Freezing Point: Not pertinent
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 1.7 at 20°C (solid)
12.8 Liquid Surface Tension: Not pertinent
12.9 Liquid Water Interfacial Tension: Not pertinent
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: Not pertinent
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: —22.1 Btu/lb = —12.3 cal/g = 0.515 X 10⁵ J/kg
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not available

NOTES

CHRIS, vol. III

7/28/87

CARBON DISULFIDE

FOH073251

CBB

Common Synonyms	Watery liquid	Colorless to yellow	Rotten egg to sweet odor
Carbon bisulfide	Sinks in water. Flammable, irritating vapor is produced.		

Avoid contact with liquid and vapor. Keep people away.
Wear goggles, self-contained breathing apparatus and rubber overclothing (including gloves).
Shut off ignition sources and call fire department.
Stop discharge if possible.
Stay upwind and use water spray to "knock down" vapor.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

FLAMMABLE.
Flashback along vapor trail may occur.
Vapor may explode if ignited in an enclosed area.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Extinguish with dry chemical or carbon dioxide.
Water and foam may be ineffective on fire.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to eyes, nose and throat.
If inhaled, will cause nausea, vomiting, difficult breathing, or loss of consciousness.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
Will burn skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Issue warning-high flammability
Restrict access
Evacuate area

2. LABEL

2.1 Category: Flammable liquid
2.2 Class: 3

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Carbon disulfide
3.2 Formula: CS_2
3.3 IMO/UN Designation: 3.1/1131
3.4 DOT ID No.: 1131
3.5 CAS Registry No.: 75-15-0

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Colorless
4.3 Odor: Faint sweetish; disagreeable; offensive, like that of decaying cabbage

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Only self-contained breathing mask with full face, approved by the United States Bureau of Mines, is recommended. If the vapor concentration exceeds 2% by volume or is unknown, supplied-air respiratory equipment of appropriate design with full face masks should be used by all persons entering contaminated area. Masks should be used only for emergency situations and should be located accordingly. Almost any type of industrial clothing is satisfactory. Splashes of small quanity are not harmful to fabrics, and evaporation from clothing is quite rapid. Clothing should, however, be removed and the skin washed with water. Goggles should be used when there is any danger of CS_2 splashes or spray.

5.2 Symptoms Following Exposure: ACUTE EXPOSURE: mild to moderate irritation of skin, eyes, and mucous membranes from liquid or concentrated vapors; headache, garlicky breath, nausea, vomiting, diarrhea (even after vapor exposures), and occasionally abdominal pain; weak pulse, palpitations; fatigue, weakness in the legs, unsteady gait, vertigo; mania, hallucinations of sight, hearing, taste, and smell in acute, massive vapor exposures; central nervous depression with respiratory paralysis; death may occur during coma or after a convulsion.

5.3 Treatment of Exposure: INHALATION: remove victim promptly from contaminated area. Administer oxygen and artificial respiration if needed. SKIN CONTACT: wash affected areas with copious quantities of water. INGESTION: induce vomiting and follow with gastric lavage and saline cathartics.

5.4 Threshold Limit Value: 10 ppm

5.5 Short Term Inhalation Limits: 200 ppm for 10 minutes, 100 ppm for 30 minutes and 50 ppm for 60 minutes.

5.6 Toxicity by Ingestion: Grade 2; rat LD_{50} = 0.1 - 0.99 g/kg

5.7 Late Toxicity: Non-specific liver cell damage in rats; higher incidence of upper respiratory disease in humans.

5.8 Vapor (Gas) Irritant Characteristics: Vapors cause moderate irritation such that personnel will find high concentrations unpleasant. The effect is temporary.

(Continued)

6. FIRE HAZARDS

6.1 Flash Point: —22°F C.C.
6.2 Flammable Limits in Air: 1.3%-50%
6.3 Fire Extinguishing Agents: Dry chemical, carbon dioxide
6.4 Fire Extinguishing Agents Not to be Used: Water and foam may be ineffective on fire.
6.5 Special Hazards of Combustion Products: Toxic gases are generated; wear self- contained breathing apparatus.
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: 212°F
6.8 Electrical Hazard: Contact of the liquid or vapor with the surface of a lighted electric light bulb could result in ignition.
6.9 Burning Rate: 2.7 mm/min.
6.10 Adiabatic Flame Temperature: Data not available

(Continued)

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 38

8. WATER POLLUTION

8.1 Aquatic Toxicity: 35 ppm/48 hr/mosquito fish/TL_m/fresh water
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Commercial; technical; USP
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: Inerted
9.4 Venting: Pressure-vacuum

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-X-Y

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Flammable liquid

11.2 NAS Hazard Rating for Bulk Water Transportation:

Category	Rating
Fire	4
Health	
Vapor Irritant	2
Liquid or Solid Irritant	2
Poisons	3
Water Polution	
Human Toxicity	1
Aquatic Toxicity	2
Aesthetic Effect	3
Reactivity	
Other Chemicals	2
Water	0
Self Reaction	0

11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	2
Flammability (Red)	3
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: 76.14
12.3 Boiling Point at 1 atm: 115°F = 46.3°C = 319.5°K
12.4 Freezing Point: —168.9°F = —111.6°C = 161.6°K
12.5 Critical Temperature: 523°F = 273°C = 546°K
12.6 Critical Pressure: 1100 psia = 76 atm = 7.7 MN/m^2
12.7 Specific Gravity: 1.26 at 20°C (liquid)
12.8 Liquid Surface Tension: 32 dynes/cm = .032 N/m at 20°C
12.9 Liquid Water Interfacial Tension: 48.4 dynes/cm = .0484 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: 2.6
12.11 Ratio of Specific Heats of Vapor (Gas): 1.292
12.12 Latent Heat of Vaporization: 153 Btu/lb = 85 cal/g = 3.559×10^5 J/kg
12.13 Heat of Combustion: —5814 Btu/lb = —3230 cal/g = -135.2×10^6 J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: 13.80 cal/g
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: 10.3 psia

5. HEALTH HAZARDS (Continued)

5.9 Liquid or Solid Irritant Characteristics: Causes smarting of the skin and first-degree burns on short exposure and may cause secondary burns on long exposure.
5.10 Odor Threshold: 0.21 ppm
5.11 IDLH Value: 500 ppm

6. FIRE HAZARDS (Continued)

6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

Chris. vol. III

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

EXAMPLE

Chemical Name Benzene Date 8/28/87

Classification _____ Job Number FOH07325F

CAS Number 71-43-2

REFERENCES CONSULTED (circle; also include MSDS if approprate.)
(NIOSH/OSHA Pocket Guide) Merck Index (Hazardline) (Chris(vol.III)) (ACGIH TLV Booklet) Toxic & Hazardous Safety Manual (SAX) (Aldrich) (RTECS) other: _____

CHEMICAL PROPERTIES: (Synonyms: benzol, benzole, cyclohexatriene)
Chemical Formula C6H6 MW 78 Ionization Potential 9.245ev
Physical State liquid Boiling Point 176°F Freezing Point 42°F
Flash Point 12°F Flammable Limits 1.3-7.1% Vapor Pressure 75mm
Specific Gravity/Density 0.879 Odor/Odor Threshold 4.68 ppm
Solubility-water: slightly Solubility-other: _____
Incompatabilities & Reactivity: strong oxidizers, chlorine, bromine

TOXICOLOGICAL PROPERTIES:
Exposure Limits: TLV-TWA (ACGIH) 10 ppm PEL (OSHA) 10 ppm
STEL none Ceiling Limits >25<50ppm/10min IDLH 2000 ppm
Toxicity Data: (Indicate duration of study)
Human; IHL Tclo 100/CNS Dermal _____ Oral Tdlo 130mg/kg:CNS
Rat/Mouse; IHL Tclo 50/24H Dermal _____ Oral LD50 3800mg/kg
Aquatic: Tlm96:100-10ppm Other: IHL:Man TC 2100mg/m3/4Y; carc.
Carcinogen human-sus Mutagen exper. Reproductive Toxin exper.
Route(s) of exposure - (circle all that apply): (Inhalation) (Ingestion) (Dermal Contact) (Eye(ocular)) (Dermal Absorption) Other _____

HANDLING RECOMMENDATIONS: (personal protective measures)
Respirators: 10 ppm use SCBA
Protective Clothing: excel-viton; good-neoprene, saranax; poor-butyl, natural rubber for gloves. Avoid skin/eye contact.
Special Equipment: none

DISPOSAL, FIRE and SPILLS: (Use numbered codes; see attached sheets for explanation.)
Disposal D Fire 6,7 Leaks&Spills 3,4,5,6,9
Decomposition Products: toxic fumes of carbon dioxide, carbon monoxide

FIRST AID:
ING: Do not induce vomiting, give water or milk, medical attent. immed.
IHL: Remove to fresh air, give artificial resp. if needed, medical attent.
Eye/Skin: Flush with water, rinse/wash skin with soap & water thoroughly.

SYMPTOMS:
acute(immediate) exposure effects: skin irritant, CNS depressant, mostly IHL, initial excitation followed by headache, dizziness, vomiting, delirium, severe exposure may see tremors, blurred vision, shallow resp., convulsions.

chronic(long term) exposure effects: anorexia, drowsiness, anemia, bleeding under skin, reduced blood clotting; liver, kidney, bone marrow damage, leukemia.

reproductive effects: None reported in humans.

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

Chemical Name Chromium (hexavalent) Date 8/28/87

DOT Classification _____ Job Number FOH0732SS

CAS Number 7440-47-3

REFERENCES CONSULTED (circle; also include MSDS if approprate.)
(NIOSH/OSHA Pocket Guide) Merck Index (Hazardline) Chris(vol.III)
(ACGIH TLV Booklet) Toxic & Hazardous Safety Manual (SAX) (Aldrich)
RTECS other: Sittig

CHEMICAL PROPERTIES: (Synonyms: Chromic oxide, soluble chromic salts)
Chemical Formula Cr (CrO3) MW 52 Ionization Potential N/A
Physical State variable Boiling Point vari. Freezing Point vari.
Flash Point variable Flammable Limits vari. Vapor Pressure vari.
Specific Gravity/Density variable Odor/Odor Threshold variable
Solubility-water: Insoluble Solubility-other: _____
Incompatabilities & Reactivity: Strong oxidizers, water

TOXICOLOGICAL PROPERTIES:
Exposure Limits: TLV-TWA (ACGIH) .05mg/m³ PEL (OSHA) .5mg/m³
STEL none est. Ceiling Limits none est. IDLH 250mg/m³
Toxicity Data: (Indicate duration of study)
Human; IHL _____ Dermal _____ Oral _____
Rat/Mouse; IHL _____ Dermal _____ Oral _____
Aquatic: _____ Other: _____
Carcinogen pos-anim Mutagen exp. Reproductive Toxin exper. teratogen
Route(s) of exposure - (circle all that apply): (Inhalation) (Ingestion)
(Dermal Contact) (Eye(ocular)) (Dermal Absorption) Other _____

HANDLING RECOMMENDATIONS: (personal protective measures)
Respirators: > any detectable limit - SCBA.
Protective Clothing: good-viton, vinyl, poor; neoprene.
Special Equipment: Prevent skin/eye contact.

DISPOSAL, FIRE and SPILLS: (Use numbered codes; see attached sheets for explanation.)
Disposal P,O Fire 13 Leaks&Spills 3,4,6,7,8,9
Decomposition Products: toxic fumes

FIRST AID:
ING: Large amounts of water, induce vomiting, medical attention immed.
IHL: Move to fresh air, artifical resp. if necessary, medical attent.
Eye/Skin: Irrigate/rinse with large amounts of water, wash skin throughly with soap & Water

SYMPTOMS:
acute(immediate) exposure effects: Contact dermatitis, irritation of mucous membranes/upper respiratory tract, coughing, wheezing, headache, fever, weight loss, ulceration of nasal septum, nausea, vomiting,

chronic(long term) exposure effects: carcinogen, liver and/or kidney damage, bronchitis, ulceration of skin, lung cancer.

productive effects: None specified for humans.

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

Chemical Name Chromium (metal) Date 8/28/87

DOT Classification _____ Job Number FOH0732SI

CAS Number 7440-47-3

REFERENCES CONSULTED (circle; also include MSDS if approprate.)
(NIOSH/OSHA Pocket Guide) Merck Index (Hazardline) Chris(vol.III)
(ACGIH TLV Booklet) Toxic & Hazardous Safety Manual (SAX) (Aldrich)
RTECS other: Sittig

CHEMICAL PROPERTIES: (Synonyms: Chromiun metal, insoluble salts)
Chemical Formula Cr MW 52 Ionization Potential N/A
Physical State variable Boiling Point 4842° F Freezing Point 3339° F
Flash Point variable Flammable Limits LEL-.23% Vapor Pressure variable
Specific Gravity/Density 7.2@82° F Odor/Odor Threshold none

Solubility-water: Insoluble Solubility-other: _____
Incompatabilities & Reactivity: strong oxiders, powdered metal is explosive

TOXICOLOGICAL PROPERTIES:
Exposure Limits: TLV-TWA (ACGIH) 0.5 mg/m³ PEL (OSHA) 1.0 mg/m³
STEL none est. Ceiling Limits none est. IDLH 500 mg/m³
Toxicity Data: (Indicate duration of study)
Human; IHL _____ Dermal _____ Oral _____
Rat/Mouse; IHL _____ Dermal _____ Oral _____
Aquatic: _____ Other: _____
Carcinogen N/A Mutagen N/A Reproductive Toxin N/A
Route(s) of exposure - (circle all that apply): (Inhalation) (Ingestion) (Dermal Contact) (Eye(ocular)) Dermal Absorption Other _____

HANDLING RECOMMENDATIONS: **(personal protective measures)**
Respirators: 5 mg/m³ - SCBA
Protective Clothing: Prevent skin/eye contact.
Special Equipment: Wear impervious clothing.

DISPOSAL, FIRE and SPILLS: **(Use numbered codes; see attached sheets for explanation.)**
Disposal P,O Fire 13 Leaks&Spills 3,4,6,7,8,9
Decomposition Products: _____

FIRST AID:
ING: Large amounts of water, induce vomiting, medical attent. immed.
IHL: Move to fresh air, artificial resp. if necessary, medical atten.
Eye/Skin: Irrigate/rinse with large amounts of water. Wash skin thoroughly with soap & water.

SYMPTOMS:
acute(immediate) exposure effects: Contact dermatitis, ulceration of skin & nasal mucosa, irritation of eyes & mucous membranes.

chronic(long term) exposure effects: Not often encountered with the 3+ state since chromium compounds in this state are of a lower order toxicity.

reproductive effects: None specified for humans.

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

Chemical Name Lead **Date** 3/28/87

DOT Classification _____ **Job Number** _____ FOH0732SI

CAS Number 7439-92-1

REFERENCES CONSULTED (circle; also include MSDS if approprate.)
(NIOSH/OSHA Pocket Guide) Merck Index (Hazardline) (Chris(vol.III)) (ACGIH TLV Booklet) Toxic & Hazardous Safety Manual (SAX) (Aldrich) (RTECS) other: Sittig

CHEMICAL PROPERTIES: (Synonyms: White lead, plumbum)
Chemical Formula Pb MW 207 Ionization Potential N/A
Physical State Variable Boiling Point 3164°F Freezing Point _____
Flash Point Incombust. Flammable Limits Incombus Vapor Pressure variable
Specific Gravity/Density 11.3 @61°FOdor/ Odor Threshold None
Solubility-water: Insoluble Solubility-other: _____
Incompatabilities & Reactivity: Strong oxidizers,perioxides,active metals

TOXICOLOGICAL PROPERTIES:
Exposure Limits: TLV-TWA (ACGIH) .15 mg/m³ PEL (OSHA) 50ug/m³
STEL None est. Ceiling Limits None est. IDLH Variable
Toxicity Data: (Indicate duration of study)
Human; IHL _____ Dermal _____ Oral Td10 450mg/kg/6Y
Rat/Mouse; IHL _____ Dermal _____ Oral Tdlo 790mg/kg
Aquatic: Unknown Other: Toxicity varies with lead cpds.
Carcinogen Indef. Mutagen Indef Reproductive Toxin exp.teratogen
Route(s) of exposure - (circle all that apply): (Inhalation) (Ingestion) (Dermal Contact) (Eye(ocular)) (Dermal Absorption) Other _____

HANDLING RECOMMENDATIONS: (personal protective measures)
Respirators: 5mg/m3 high efficiency particulate respirator, other concentrations - SCBA.
Protective Clothing: Avoid skin and eye contact
Special Equipment: None

DISPOSAL,FIRE and SPILLS: (Use numbered codes;see attached sheets for explanation.)
Disposal P Fire 13 Leaks&Spills 7,8,10
Decomposition Products: Toxic fumes of lead

FIRST AID:
ING: Give water, induce vomiting, medical attention immed.
IHL: Move to fresh air, artifical resp. if necessary, medical attent.
Eye/Skin: Irrigate/wash with water. Wash skin thoroughly with soap & water.

SYMPTOMS:
acute(immediate) exposure effects: Cumulative neurotoxin-commonly occurs from prolonged exposure.Symptoms include stomach distress,vomiting, diarrhea,black stools, anemia, nervous system effects.
chronic(long term) exposure effects: 3 clinical types:a-ailmentary-abominal pain,discomfort,constipation or diarrhea,metallic taste,lead line on gum ,adache. b-nueromuscular, muscle weakness,joint/muscle pain,dizziness, ,somnia,paralysis c-encephalic:brain involvement,stupor,coma,death,rare.
reproductive effects: Human epid. studies have concluded that lead is a poison to male & female germ cells;increased incidence of miscarriages, stillbirths, sterility in females;sperm depression & decreased motiltiy in males

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

Chemical Name Polychlorinated Biphenyl Arochlor 1242 (PCB) **Date** 8/28/87

DOT Classification _____ **Job Number** _____

CAS Number 53469-21-9 Folio 732 SZ

REFERENCES CONSULTED (circle; also include MSDS if approprate.)
(NIOSH/OSHA Pocket Guide) Merck Index Hazardline (Chris(vol.III)
(ACGIH TLV Booklet) Toxic & Hazardous Safety Manual (SAX) Aldrich
(RTECS) other: Sittig, Casarett & Doull's Toxicology, NIOSH-Occupaitonal Health Guidelines

CHEMICAL PROPERTIES: (Synonyms: Arochlor 1242/42% chlorine, chlorodiphenyl)
Chemical Formula $C_{12}H_7Cl_3$ MW 258 Ionization Potential N/A
Physical State dark liquid Boiling Point 617-691°F Freezing Point -2°F
Flash Point 349°F Flammable Limits Unknown Vapor Pressure .001mm
Specific Gravity/Density 1.3-1.8 Odor/Odor Threshold not good warning
Solubility-water: Insoluble Solubility-other: _____
Incompatabilities & Reactivity: Strong Oxidizers

TOXICOLOGICAL PROPERTIES:
Exposure Limits: TLV-TWA (ACGIH) 1mg/m³ PEL (OSHA) 1mg/m³
STEL 2mg/m³ Ceiling Limits none est. IDLH 10mg/m³
Toxicity Data: (Indicate duration of study)
Human; IHL Tclo 10mg/m3 Dermal _____ Oral _____
Rat/Mouse; IHL _____ Dermal _____ Oral LD50 4250mg/kg
Aquatic: Tlm 96: .278ppm Other: _____
Carcinogen Sus-hum. Mutagen anim-pos. Reproductive Toxin teratogenic
Route(s) of exposure - (circle all that apply): (Inhalation) (Ingestion) (Dermal Contact) (Eye(ocular)) (Dermal Absorption) Other _____

HANDLING RECOMMENDATIONS: (personal protective measures)
Respirators: >any detectable limit - SCBA.
Protective Clothing: Excel-viton; good-butyl, vinyl, nitrile; poor-neoprene.
Special Equipment: Safety goggles, clothing to avoid contact.

DISPOSAL, FIRE and SPILLS: (Use numbered codes; see attached sheets for explanation.)
Disposal D, O Fire 7 Leaks&Spills _____
Decomposition Products: Toxic vapors of hydrogen chloride, CO

FIRST AID:
ING: Medical atten. immed. Give salt water, induce vomiting.
IHL: Move to fresh air, artifical resp. if necessary, medical atten.
Eye/Skin: Irrigate/rinse immed. with water. Wash skin thoroughly with soap & water.

SYMPTOMS:
acute(immediate) exposure effects: Irritation of eyes, nose, throat. Can cause vomiting, edema, anorexia, nausea, abdominal pain, fatigue.

chronic(long term) exposure effects: Chloracne from prolonged skin ontact. Acute & chronic exposure may cause liver damage or cancer.

eproductive effects: Accidental oral intakes have shown that PCB'S may be embryotoxic causing stillbirth, characteristic grey-brown skin, and increased eye discharge to infants born to women exposed during pregnancy.

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

Chemical Name Polychlorinated Biphenyl (PCB) - Arochlor 1254 **Date** 8/28/87

DOT Classification _____ **Job Number** _____ FOH0732SI

CAS Number 11097-69-1

REFERENCES CONSULTED (circle; also include MSDS if approprate.)
(NIOSH/OSHA Pocket Guide) Merck Index Hazardline (Chris(vol.III))
(ACGIH TLV Booklet) Toxic & Hazardous Safety Manual (SAX) Aldrich
(RTECS) other: Sittig,Casarett & Doull's Toxicology, NIOSH-Occupational Health Guidelines

CHEMICAL PROPERTIES:(Synonyms: Arochlor 1254 (54% chlorine), chlorodiphenyl)
Chemical Formula $C_{12}H_5Cl_5$ MW 326 Ionization Potential N/A
Physical State viscous liq.dBoiling Point689-734°F Freezing Point 50°F
Flash Point 432°F Flammable Limits Unknown Vapor Pressure .00006mm
Specific Gravity/Density 1.5 Odor/Odor Threshold not good warning
Solubility-water: Insoluble Solubility-other: _____
Incompatabilities & Reactivity: Strong oxidizers, heat

TOXICOLOGICAL PROPERTIES:
Exposure Limits: TLV-TWA (ACGIH) 0.5 mg/m³(skin) PEL (OSHA) 0.5 mg/m³
STEL 1mg/m³ Ceiling Limits none est IDLH 5mg/m³
Toxicity Data: (Indicate duration of study)
Human; IHL _____ Dermal _____ Oral _____
Rat/Mouse; IHL _____ Dermal Tdlo 4mg/kg;ETA Oral LD50 1295 mg/kg
Aquatic: _____ Other: _____
Carcinogen sus-hum. Mutagen exp Reproductive Toxin exp.teratogen
Route(s) of exposure - (circle all that apply): (Inhalation) (Ingestion)
(Dermal Contact) (Eye(ocular)) (Dermal Absorption) Other _____

HANDLING RECOMMENDATIONS: **(personal protective measures)**
Respirators:>any detectable limit - SCBA
Protective Clothing: Excel-viton;good-butyl,vinyl,nitrile;poor-neoprene.
Special Equipment: Clothing to avoid contact,safety goggles.

DISPOSAL,FIRE and SPILLS:**(Use numbered codes;see attached sheets for explanation.)**
Disposal D.0 Fire 7 Leaks&Spills _____
Decomposition Products: Toxic fumes of hydrogen chloride and CO.

FIRST AID:
ING: Medical atten. immed.,give salt water, induce vomiting.
IHL: Move to fresh air, artifical resp. if necessary, medical atten.
Eye/Skin:Irrigate/rinse immed. with water. Wash skin thoroughly with soap and water.

SYMPTOMS:
acute(immediate) exposure effects: Irritation of eyes,nose,throat.Can cause vomiting,edema,anorexia, nausea, abdominal pain. fatigue.

chronic(long term) exposure effects:Chloracne or dermatitis from prolonged skin contact, jaundice, dark urine,liver damage or cancer. Increase in chlorination increases toxicity of PCB (see Arochlor 1242).

oductive effects: Accidental oral intake has shown that PCB's may be cryotoxic causing stillbirth,characteristic grey-brown skin,and increased eye discharge to infants born to women exposed during pregnancy.

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

Chemical Name Toluene Date 8/28/87

DOT Classification _____ Job Number FO40732S

CAS Number 108-88-3

REFERENCES CONSULTED (circle; also include MSDS if approprate.)
(NIOSH/OSHA Pocket Guide) Merck Index (Hazardline) (Chris(vol.III))
(ACGIH TLV Booklet) Toxic & Hazardous Safety Manual (SAX) (Aldrich)
RTECS other: Sittig

CHEMICAL PROPERTIES: (Synonyms: Phenyl methane, methyl benzene)
Chemical Formula $C_6H_5CH_3$ MW 92 Ionization Potential 8.82ev
Physical State liquid Boiling Point 231°F Freezing Point -139°F
Flash Point 40°F Flammable Limits 1.27-7% Vapor Pressure 22mm
Specific Gravity/Density 0.867 Odor/Odor Threshold 0.17ppm
Solubility-water: slightly Solubility-other: _____
Incompatabilities & Reactivity: Strong oxidizers, nitric acid, peroxides

TOXICOLOGICAL PROPERTIES:
Exposure Limits: TLV-TWA (ACGIH) 100ppm PEL (OSHA) 200ppm
STEL 150ppm(skin) Ceiling Limits 300ppm/15min IDLH 2000 ppm
Toxicity Data: (Indicate duration of study)
Human; IHL Tclo 200ppm Dermal _____ Oral _____
Rat/Mouse; IHL Lclo 4000pm/4H Dermal _____ Oral _____
Aquatic: Tlm 96: 100-10ppm Other: _____
Carcinogen exper. Mutagen exper Reproductive Toxin exp.teratogen
Route(s) of exposure - (circle all that apply): (Inhalation) (Ingestion)
(Dermal Contact) (Eye(ocular)) Dermal Absorption Other _____

HANDLING RECOMMENDATIONS: (personal protective measures)
Respirators: 1000ppm-APR w/chemical cartridge; 2000 ppm-SCBA
Protective Clothing: Excel-viton: Good-Polyurethane, neoprene/styrene;
Poor-neopene, butyl.
Special Equipment: None

DISPOSAL, FIRE and SPILLS: (Use numbered codes; see attached sheets for explanation.)
Disposal D Fire 6.7 Leaks&Spills 3,4,5,6,9
Decomposition Products: CO, CO_2

FIRST AID:
ING: Do not induce vomiting, contact physician immed.
IHL: Remove to fresh air, artifical resp, if necessary.
Eye/Skin: Irrigate/wash with large amounts of water for at least 15 min.

SYMPTOMS:
acute(immediate) exposure effects: IHL: dizziness, headache, ING: vomiting, nausea, diarrhea. Liquid irritates eyes, dries skin.

chronic(long term) exposure effects: Kidney and/or liver damage if ingested. nhalation may cause anemia, bone marrow hypoplasia. Dermatitis with skin ontact.

reproductive effects: None

Ecology and Environment, Inc.
Hazard Evaluation of Chemicals
Region V - Chicago

Chemical Name Xylene (mixed isomers) Date 8/28/87

DOT Classification _____ Job Number ~~FOH0592.SI~~ FOH0732

CAS Number 1330-20-7

REFERENCES CONSULTED (circle; also include MSDS if approprate.)
(NIOSH/OSHA Pocket Guide) Merck Index (Hazardline) (Chris(vol.III))
(ACGIH TLV Booklet) Toxic & Hazardous Safety Manual (SAX) (Aldrich)
RTECS other: Sittig

CHEMICAL PROPERTIES: (Synonyms: dimethyl benzene, aromatic hydrocarbons)
Chemical Formula $C_6H_4(CH_3)_2$ MW 106 Ionization Potential 8.56/8.44ev
Physical State liquid Boiling Point 292/282°F Feezing Point -12°F
Flash Point 81-90°F Flammable Limits 1-7% Vapor Pressure 7-9mm
Specific Gravity/Density .864 Odor/Odor Threshold .05ppm
Solubility-water: Insoluble Solubility-other: Miscible-ether,ethanol
Incompatabilities & Reactivity: strong oxidizers

TOXICOLOGICAL PROPERTIES:
Exposure Limits: TLV-TWA (ACGIH) 100ppm PEL (OSHA) 100ppm
STEL 150ppm Ceiling Limits none est. IDLH 10,000ppm
Toxicity Data: (Indicate duration of study)
Human; IHL Tclo 200ppm Dermal _____ Oral _____
Rat/Mouse; IHL _____ Dermal _____ Oral _____
Aquatic: 96hr: 22ppm Other: _____
Carcinogen neg-anim Mutagen exper Reproductive Toxin exp.teratogen
Route(s) of exposure - (circle all that apply): (Inhalation) (Ingestion)
(Dermal Contact) (Eye(ocular)) Dermal Absorption Other _____

HANDLING RECOMMENDATIONS: (personal protective measures)
Respirators: 1000 ppm APR, 5000 ppm - SCBA
Protective Clothing: Good-nitrile,viton; poor-butyl rubber,neoprene.
Special Equipment: Safety goggles,protective clothing for prolonged exposures.
DISPOSAL,FIRE and SPILLS: (Use numbered codes;see attached sheets for explanation.)
Disposal D Fire 6,7 Leaks&Spills 3,4,5,6,9
Decomposition Products: CO, CO_2

FIRST AID:
ING: Do not induce vomiting, contact physician; immediately.
IHL: Move to fresh air, artificial resp. if necessary.
Eye/Skin: Irrigate/rinse with water for at least 15 min. Wash skin throughly with soap and water.

SYMPTOMS:
acute(immediate) exposure effects: Vapors cause dizziness, headache, coughing, pulmonary distress & edema. Nausea,vomiting,abdominal cramps also seen with over-exposure.

Chronic(long term) exposure effects: Possible liver and/or kidney damage, pulmonary congestion. Ingestion may be fatal.

Reproductive effects: None

WASTE-DISPOSAL METHODS

The disposal methods outlined below are intended only as guides. We do not assume responsibility for their use. Careful consideration must be given to the chemical and physical properties of the substance. In addition, local laws and regulations may preclude the use of these methods which are primarily designed for small quantities. Observe all federal, state, and local laws.

The disposal of some chemicals may require deactivation or modification of the material by chemical means. Chemical waste-disposal reactions must be handled with the same care and consideration used with synthetic procedures. Appropriate consideration must be given to reaction conditions, *i.e.*, stoichiometry, order and rate of addition, heat of reaction, evolution of gaseous products, mixing efficiency of stirring, rate of reaction, atmospheric sensitivity, etc.

Chemical waste-disposal reactions should be carried out in a chemical fume hood and in appropriate laboratory glassware. Because these reactions are often hazardous, protective safety equipment such as safety goggles, respirator, gloves, face and/or safety shield and other protective equipment must be used.

Initial reactions in a disposal sequence should be carried out on a small scale (5-10g). The reactant concentrations should not exceed 10% of the reaction volume and the final reaction volume should not exceed 50% of the working capacity of the reaction vessel, regardless of the reaction scale. Larger quantities of the material should be handled in several small-size reactions. To ensure completion of reaction, the waste disposal procedure should be run for at least an additional 4 to 8 hours after all materials have been mixed.

All reactions should be run by technically qualified persons familiar with the potential hazards of the chemical reactions.

Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

The material should be ignited in the presence of sodium carbonate and slaked lime (calcium hydroxide). The substance should be mixed with vermiculite and then with the dry caustics, wrapped in paper and burned in a chemical incinerator equipped with an afterburner and scrubber.

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber.

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable.

To a solution of the product in water, add an excess of dilute sulfuric acid. Let stand overnight. Remove any insolubles and bury in a landfill site approved for hazardous-waste disposal.

Cautiously dissolve the material in water. Neutralize immediately with sodium carbonate or, if the material does not dissolve completely, add a little hydrochloric acid followed by sodium carbonate. Add calcium chloride in excess of the amount needed to precipitate the fluoride and/or carbonate. Separate the insoluble material and bury in a landfill site approved for hazardous-waste disposal.

G Under an inert atmosphere, cautiously add the material to dry butanol in an appropriate solvent. The chemical reaction may be vigorous and/or exothermic. Provisions must be made for venting of large volumes of highly flammable hydrogen and/or hydrocarbon gases. Neutralize the solution with aqueous acid. Filter off any solid residues for disposal as hazardous waste. Burn the liquid portion in a chemical incinerator equipped with an afterburner and scrubber.

H Neutralize the solution and add filtering agent (10g per 100ml). Evaporate the liquid and bag the residual solid for burial in a landfill site approved for hazardous-waste disposal.

I Dissolve the solid in (or dilute the solution with) a large volume of water. Carefully add a dilute solution of acetic acid or acetone to the mixture in a well ventilated area. Provisions should be made to vent safely the hydrogen gas given off during the decomposition. Check acidity of the solution and adjust to pH 1 if necessary. Let stand overnight. Neutralize the solution (pH 7). Evaporate the solution and bury the residue in a landfill site approved for hazardous-waste disposal.

J Cautiously acidify a 3% solution or a suspension of the material to pH 2 with sulfuric acid. Gradually add a 50% excess of aqueous sodium bisulfite with stirring at room temperature. An increase in temperature indicates that a reaction is taking place. If no reaction is observed on the addition of 10% of the sodium bisulfite solution, initiate it by cautiously adding more acid. If manganese, chromium, or molybdenum is present, adjust the pH of the solution to 7 and treat with sulfide to precipitate for burial as hazardous waste. Destroy excess sulfide, neutralize and flush solution down the drain.

K Please contact the Technical Services Department. Be sure to mention name, catalog number and quantity of the material.

L The material should be dissolved in 1) water; 2) acid solution or 3) oxidized to a water-soluble state. Precipitate the material as the sulfide, adjusting the pH of the solution to 7 to complete precipitation. Filter the insolubles and dispose of them in a hazardous-waste site. Destroy any excess sulfide with sodium hypochlorite. Neutralize the solution before flushing down the drain.

M A slurry of the arenediazonium salt with water can be disposed of by adding it gradually to a stirred solution of 5-10% excess 2-naphthol in 3% aqueous sodium hydroxide at 0-20°C. After 12 hours, the resulting azo dye is filtered and either incinerated or buried in a landfill site approved for hazardous-waste disposal. Neutralize the remaining solution before disposal.

N For small quantities: cautiously add to a large stirred excess of water. Adust the pH to neutral, separate any insoluble solids or liquids and package them for hazardous-waste disposal. Flush the aqueous solution down the drain with plenty of water. The hydrolysis and neutralization reaction may generate heat and fumes which can be controlled by the rate of addition.

O Bury in a landfill site approved for the disposal of chemical and hazardous waste.

P Material in the elemental state should be recovered for reuse or recycling.

Q Cautiously make a 5% solution of the material in water or dilute acid. There may be a vigorous, exothermic reaction and fumes may be generated due to the hydrolysis of the material. Control any reaction by cooling and by the rate of addition of the material. Gradually add dilute ammonium hydroxide to pH 10. Filter off any precipitate for disposal in a chemical landfill. If there is no precipitation, gradually adjust the pH from 10 to 6, stopping when precipitation occurs.

R Catalysts and expensive metals should be recovered for reuse or recycling.

S Treat a dilute basic solution (pH 10-11) of the material with a 50% excess of commercial laundry bleach. Control the temperature by the addition rate of bleach and adjust pH if necessary. Let stand overnight. Cautiously adjust solution to pH 7. Vigorous evolution of gas may occur. Filter any solids for burial in a chemical landfill. Precipitate any heavy metals by addition of sulfide and isolate for burial. Additional equivalents of hypochlorite may be needed if the metal can be oxidized to a higher valence state. For metal carbonyls, the reaction should be carried out under nitrogen.

T Cautiously make a 5% solution of the product in water; vent because of possible vigorous evolution of flammable hydrogen gas. Acidify the solution to pH 1 by adding 1*M* sulfuric acid dropwise. Acidification will cause vigorous evolution of hydrogen gas. Allow the solution to stand overnight. Evaporate the solution to dryness and bury the residue in a landfill site approved for hazardous-waste disposal.

U Take the material (or a solution) and make a 5% solution in tetrahydrofuran. Cautiously add the solution dropwise to an ice-cooled, stirred basic solution of commercial bleach. Oxidation may release flammable hydrocarbon gases which must be vented. Let stand overnight. Adjust the pH to 7 and destroy excess hypochlorite with sodium bisulfite before disposal of the solution.

V Under an inert atmosphere cautiously add dry butanol or a mixture of dry butanol in an appropriate solvent, to a solution of the material in tetrahydrofuran. The chemical reaction may be vigorous and/or exothermic. Provisions must be made for the venting of a large volume of flammable hydrogen gas. When gas evolution ceases, cautiously add a basic hypochlorite solution dropwise to the reaction solution. Let stand overnight. Neutralize the solution and treat with sodium bisulfite to destroy any excess hypochlorite. Filter any solids for burial in a landfill site approved for hazardous-waste disposal.

THE SIGMA-ALDRICH LIBRARY OF CHEMICAL SAFETY DATA

Explanation of Codes

PROCEDURES FOR SPILLS OR LEAKS

1 Absorb on sand or vermiculite and place in closed container for disposal.
2 Cover with dry lime, sand, or soda ash. Place in covered containers using nonsparking tools and transport outdoors.
3 Shut off all sources of ignition.
4 Evacuate area.
5 Cover with an activated carbon adsorbent, take up and place in closed container. Transport outdoors.
6 Ventilate area and wash spill site after material pickup is complete.
7 Sweep up, place in a bag and hold for waste disposal.
8 Avoid raising dust.
9 Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.
10 Wear respirator, chemical safety goggles, rubber boots and heavy rubber gloves.
11 Cover with dry lime or soda ash, pick up, keep in a closed container and hold for waste disposal.
12 Carefully sweep up and remove.
13 Flush spill area with copious amounts of water.
14 Mix with solid sodium bicarbonate.
15 Place in appropriate container.
16 Wear protective equipment.
17 Wash spill site with soap solution.
18 Please contact the Technical Services Department. Be sure to mention the name and catalog number of the material.

FIRE-EXTINGUISHING MEDIA

1 Carbon dioxide.
2 Dry chemical powder.
3 Water spray.
4 Alcohol or polymer foam.
5 Class D fire-extinguishing material only.
6 Water may be effective for cooling, but may not effect extinguishment.
7 Carbon dioxide, dry chemical powder, alcohol or polymer foam.
8 Foam and water spray are effective but may cause frothing.
9 Do not use dry chemical powder extinguisher on this material.
10 Do not use carbon dioxide extinguisher on this material.
11 Noncombustible.
12 Do not use water.
13 Use extinguishing media appropriate to surrounding fire condition

Z14,866-0

Sigma-Aldrich Corporation, P.O. Box 355, Milwaukee, Wisconsin 53201 USA
(Sigma: 314-771-5765; Aldrich: 414-273-3850)

Medtox Hotline

1. Twenty-four hour answering service - (501) 370-8263

   What to Report:

   ° State: "This is an emergency."

   ° Your name, region, and site

   ° Telephone number to reach you

   ° Name of person injured or exposed

   ° Nature of emergency

   ° Action taken

2. One of three toxicologists (Drs. Raymond Harbison, Richard Freeman, or Robert James) will contact you. Repeat the information given to the answering service.

3. If a toxicologist does not return your call within 15 minutes, call the following persons in order until contact is made:

   E & E Corporate Headquarters (EST 0830-1700) - (716) 632-4491

   a. Twenty-four hour line - (716) 631-9530

   b. Corporate Safety Director - Paul Jonmaire (Office) (716) 632-4491

   c. Assistant Corporate Safety Officer - Steve Sherman (home (716) 688-0084)

Regional Office

Office Phone Number: (312) 663-9415

	Name	Home
Team Leader	Rene' Van Someren	(312)763-7335
Regional Safety Coordinator	Paul Moss	(312)541-6635

PROCEDURES TO FOLLOW WHEN INVOLVED IN A VEHICULAR ACCIDENT ON COMPANY TIME

1. Determine if there are any injuries. If so, call for police and medical assistance immediately.

2. Then call the office as soon as possible and ask to speak to the following people in order they appear here: Mary Ann Spidalette, Kathy Getty, Rene' Van Someren, Jerry Oskvarek, Tim McDermott, Mary Jane Ripp or Mike Miller. If there are injuries to any E & E personnel or if there are serious injuries to the other party, try to reach any of these people at home. Try to have as much information as possible about any injuries sustained.

3. If there are no injuries, call the police and then call the office as soon as possible.

You will be asked to provide the following information when you call in to the office. Obtain as much information as possible before calling.

1. Name(s) of the owner(s) of the other vehicle(s) involved and any occupants.

2. Insurance carrier(s) of the other party(ies).

3. License plate and vehicle registration numbers of the other vehicle(s) involved. In addition, note the make, model and year of the car(s).

4. Name(s) of our driver and any occupants.

5. License plate and serial numbers of our vehicle as well as the make, model and year. If our vehicle is a rental car, also state the rental agency and location.

6. Location and time of the accident.

7. Description of the accident itself. Include circumstances such as the weather and physical surroundings. Upon return to the office, you will be asked to provide a sketch of the accident so you should rough draft the sketch at the scene.

8. Obtain at least one copy of the police report. This will be submitted to Buffalo with a memo and the sketch.

9. Description of damage done to our vehicle and any other involved vehicles. If you have a camera, take pictures of the damage done and any other informative or contributing conditions.

10. If the vehicle is ours and not a rental, you will need to obtain 3 estimates for repair. Depending on the degree of damage, this may be done in the field or back in Chicago.

When completing the police report, you may need the following information if you were driving one of our vehicles:

1. Our vehicles are owned by the U.S. Government; Environmental Protection Agency; c/o Ecology and Environment, Inc., Hans Neumaier, Director of Administrative Services.

2. Our insurance is with Fireman's Fund, c/o E & E, Hans Neumaier, Director of Administrative Services.

3. Buffalo's address is:

195 Holtz
Buffalo, NY 14225

91Q:1X

ECOLOGY & ENVIRONMENT, INC.
REGION V EMERGENCY INFORMATION

Revised 4/87
PDM

Non-responsive

ECOLOGY & ENVIRONMENT, INC.
REGION V EMERGENCY INFORMATION

Revised 4/87
PTM

Non-responsive

ECOLOGY & ENVIRONMENT, INC.
REGION V EMERGENCY INFORMATION

Revised 4/87
PDM

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Revised 4/87

Non-responsive

ECOLOGY & ENVIRONMENT, INC.
REGION V EMERGENCY INFORMATION

Revised 4/87

Non-responsive

Non-responsive

SITE DOSIMETER LOG

TDD# F05-8708-023 SITE NAME NAMAN CO. / CARAVAN CO.

SITE SAFETY OFFICER D. CLARK WEEK OF 8/29/87

NAME AND DOSIM. #	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
D. KAISER							
C. ALMANZO							
D. CLARK							
T. SHORT							
C. SCHLESINGER							

To the nearest half-hour, record time spent downrange as "S" (e.g., S: 2.5 hrs), time spent in active PDS operation as "P", and any time spent downrange in rescue activity as "R".

ECOLOGY & ENVIRONMENT, INC.
REGION 5
FIELD EQUIPMENT CHECKLIST

TEAM LEADER: DIRK KAISER

PAN: FOH0732SI

DATE OF DEPARTURE: 8/24/87

EXPECTED DATE OF RETURN: 8/28/87

A) Safety Instruments

____ Photovac TIP ID# _____
____ HNU, 10.2 OR 11 LAMP ID# _____
1 OVA (organic vapor analyzer) ID# _____
1 Explosimeter/02 meter ID# _____
____ Drager pump, specify tube type (HCN, Natural Gas, or other) ID# _____
1 Rad-Mini ID# _____
____ Radiation, other: _____ ID# _____
____ Monitox (HCN) ID# _____
____ Heat stress monitor ID# _____
____ Noise equipment ID# _____
____ Dust monitor-MDA system ID# _____

B) First Aid Equipment (specify quantity)

1 First aid kit
____ Oxygen inhalator
5 Safty Glasses

____ Life vests
____ Ice vests
1 Eye wash bottle

C) Respiratory Equipment (specify quantity)

____ Racal P.A.P.R. ID# _____
____ Robert Shaw escape mask ID# _____
____ MSA SCBA ID# _____
____ Extra air cylinders ID# _____

D) Respiratory Cartridges (specify quantity)

10 GMC-H
____ GM-P
____ HEPA (for racal)
____ Other: _____

E) Protective Clothing

1. Suits (specify quantity)

____ Splash aprons
____ Saranex, Size: M__, L__, XL__
10 Tyvek, Size: M 1, L 3, XL 1, XXL__
____ Butyl acid suits
____ Fully encapsulated suits
____ Other: _____

2. Gloves (specify quantity)

1 Box Latex disposable, Size: M__, L__
____ Butyl Rubber, Size: M__, L X
____ Nitrile, Size: M__, L__
____ Neoprene, Size: M__, L__
4pr Viton, Size: M__, L__
____ Glove liners, Size: M__, L__

3. Boots (specify quantity)

____ Neoprene, Size: _____
10 Latex disposable, Size: L__, XL__
____ Other: _____, Size: _____

A) Vehicles

____ Suburban ID# _____
____ Cargo Van ID# _____
1 Step Van ID# _____

B) Sample Bottles (specify quantity)

____ 80 oz. amber glass
____ 1 lt. amber glass
____ 40 ml. vial
____ 1 lt. plastic
12 8 oz. glass
12 120 ml. glass
____ Dioxin Sample Kit

C) Preservatives (specify quantity)

____ HNO3
____ NaOH
____ Other: _____

D) Decon Supplies (specify quantity)

____ Wash tubs
2 Buckets
2 Scrub brushes
____ Solvent
1 Detergent (Alconox)
2 MSA Sanitizing solution

E) Field Equipment ____ (specify quantity)

____ Conductivity meter ID# _____
____ PH meter ID# _____
____ Thermometer ID# _____
____ Masterflex pump and filter apparatus ID# _____
1 Camera ID# _____
____ Compass ID# _____
____ Water-level indicator ID# _____
____ Split-spoon samplers ID# _____
____ Bailers ID# _____
____ Magnetometer ID# _____
____ Resistivity meter ID# _____
____ Robair pump system ID# _____
____ PVC hand pump ID# _____
____ Well point sampler ID# _____
____ Air sampling pump kits ID# _____
____ Buck calibrator ID# _____
____ Meteorological station ID# _____
____ Metal detector ID# _____
____ Level/tripod and rod ID# _____
____ Pitcher pump ID# _____
____ Photovac ID# _____
____ Thermal desorber ID# _____
____ Other: _____ ID# _____

COOLERS
VERMICULITE
3 SPOONS / SHOVELS
SEDIMENT GRAB
STAINLESS STEEL BOWLS

ECOLOGY AND ENVIRONMENT, INC.
FIELD INVESTIGATION TEAM
ON-SITE SAFETY MEETING

Project NAIMAN CO./CARAVAN CO.

Date _____ Time _____ Job No. FOH0732ST

Address _____

Specific Location _____

Type of Work _____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment _____

Chemical Hazards _____

Physical Hazards _____

Emergency Procedures _____

Hospital/Clinic _____ Phone _____

Special Equipment _____

Other _____

ECOLOGY AND ENVIRONMENT, INC.
FIELD INVESTIGATION TEAM
ON-SITE SAFETY MEETING

ATTENDEES

Name (Printed)	Signature
DIRK KAISER	
DON CLARK	
RON SHORT	
CRAIG ALMANZA	
CATHY SCHLESINGER	

Meeting Conducted By:

DON CLARK

Site Safety Officer:

DON CLARK

Team Leader:

DIRK KAISER

ON-SITE SAFETY LOG

ECOLOGY AND ENVIRONMENT, INC.
CHICAGO

A. ON-SITE MONITORING

	EQUIPMENT USED	BACKGROUND READING IN BREATHING ZONE	CALIBRATED AT	ON-SITE READING IN BREATHING ZONE
1.	OVA			
2.	RAD MINI			
3.	EXPLOSIMETER + calib. gas.			
4.	O_2 METER			
5.				

B. PROTECTIVE CLOTHING WORN: _____

C. SITE NAME: NAIMAN CO/CARAVAN CO. PROJECT NUMBER: F0H07325I
DATE: _____
WEATHER CONDITIONS: _____
NAMES OF ATTENDEES AT SITE: _____

D. COMMENTS ON MONITORING OR PROTECTIVE CLOTHING _____

	NAME	SIGNATURE
TEAM LEADER:	DIRK KAISER	
SITE SAFETY OFFICER:	DON CLARK	

(P.D. Moss, 1/85)